

STAT 150 – Introduction to Statistical Investigations

Fall 2003

1. Catalog Description

STAT 150 Introduction to Statistical Investigations (4)

Orientation to the statistics program. Introduction to the discipline of statistics and the nature of statistical reasoning. Design of surveys and experiments, graphical and numerical summaries, statistical models, and interpretation of results. Development of discussion, writing, presentation, and evaluation skills. 4 lectures.

2. Required Background and/or Experience

None.

3. Expected Outcomes

The student should be able to:

- a. appreciate the role of statistics in the scientific enterprise.
- b. understand the importance of sound data collection strategies.
- c. plan an effective data collection strategy to address a particular question.
- d. conduct preliminary analyses of data involving graphical and numerical components.
- e. construct statistical models for data, evaluate the adequacy of their fit, and make predictions based on them.
- f. critically read, summarize, and evaluate articles from popular media involving statistics.
- g. present clear arguments concerning statistical issues orally and in writing.

4. Text and References

Text: Moore, David S., *Statistics: Concepts and Controversies*, 5th ed., Freeman, 2001.

5. Minimum Student Materials

Scientific calculator.

6. Minimum University Facilities

Computer lab preferred.

7. Expanded Description of Content and Method

Course content will be organized around five major units:

	<u>Number of Lectures</u>
I. Overview of Statistics	4
"Big picture" of statistical process; history of the field; career opportunities; ethical issues; case studies	
II. Data Collection Strategies	8
Anecdotal evidence; available data; surveys; observational studies; controlled experiments; bias; precision; randomness; randomization; confounding; causation	
III. Descriptive Statistics - Graphical	6
Histograms; dotplots; stemplots; boxplots; bar graphs; segmented bar graphs; scatterplots	
IV. Descriptive Statistics - Numerical	6
Measures of center - mean, median; measures of spread- standard deviation, interquartile range; measures of association - correlation, conditional percentages; resistance	
V. Statistical models for data	8
Linear regression; additive model for two-way tables; probability models; assessing fit; model-data dialogue.	
In addition, sprinkled throughout the course will be sessions specifically devoted to issues of communication in writing and in oral presentation.	4
Total	<hr style="width: 50px; margin-left: auto; margin-right: 0;"/> 36

Method:

Specific content can vary from instructor to instructor. For example, some might concentrate on regression models and analysis, while others might organize the course around design and analysis of experiments, and a third option might emphasize exploratory methods and models. Regardless of the specific statistical content, the fundamental ideas presented above and the learning goals remain the same and provide the focus of the course.

8. Method of Evaluating Outcome

Students' learning in this course will be assessed by:

- a. projects.
- b. exams.
- c. homework assignments.
- d. class participation/discussion.

Students' project work reveals the extent to which they achieve all of the learning goals listed

above, so project work will carry the most weight in the assessment process. Exams can assess students' progress chiefly on learning outcomes b-e; they will focus on explanations and interpretations as much as on calculations. Homework assignments, required at least weekly, will also assess students' learning of these goals, while evaluation of students' contributions to class discussions pertains mostly to learning outcomes f and g. All instructors will use these assessment methods. Individual instructors may weight the assessment methods differently, but the project component will always carry the most weight.